# SYSTEM AND METHOD FOR TAKING OVER A DOCUMENT

INCORPORATION BY REFERENCE

The present application claims priority from Japanese application JP 2003-276968 filed on July 18, 2003, the content of which is hereby incorporated by reference into this application.

BACKGROUND OF THE INVENTION

The present invention relates to a system for converting handwritten input information into electronic data and a method thereof, and more particularly to a document taking-over system and method for delivering the handwritten input information as the electronic data of a predetermined format to a system that utilizes the data.

Generally, an OCR (Optical Character Recognition) apparatus is used to convert input information handwritten on a document or slip into electronic data in order to process the data in computers or the like. In the OCR apparatus, a scanner is used to read characters handwritten on a document and recognize the read characters to thereby prepare or produce the electronic data. Such an OCR apparatus is defective in that an optical scanner is used to read characters and accordingly a recognition rate of characters is reduced when the layout in the document is complicated.

As a handwritten information input apparatus that solves such a defect, there is an apparatus using an electronic pen. For example, U.S. Pat. No. 6570104B1 discloses a handwritten information input apparatus using an electronic pen which can read a

special dot pattern which is printed on a document and can specify a position and store the read pattern. The electronic pen of U.S. Pat. No. 6570104B1 includes a light emitting diode disposed in a cylindrical body

5 thereof and which irradiates the surface of the document having the special dot pattern printed thereon with light emitted from the light emitting diode and an optical sensor which detects light reflected from the surface of the document to thereby read the dot pattern

10 printed on the surface of the document and store it in a memory of the body. The stored data is analyzed to convert input information handwritten on the document into electronic data. According to the apparatus described in U.S. Pat. No. 6570104B1, even if the

15 contents of the document are printed by a complicated layout, only characters written thereon can be converted into electronic data exactly.

However, when it is considered that the apparatus described in U.S. Pat. No. 6570104B1 is

20 utilized in cooperation with an existing system such as a business system, the electronic data inputted by the apparatus has no attribute information as to what kind of contents is indicated by individual data contained in the electronic data and accordingly the electronic

25 data cannot be utilized as it is.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present

invention to provide an apparatus and method for processing electronic data inputted by means of such an electronic pen into electronic data of a predetermined format in a corresponding manner to layout information

5   printed on a document and delivering it to an existing system.

In order to solve the above problem, according to the present invention, the document taking-over system comprises an electronic pen terminal

10  provided with an electronic pen which gets information written by hand on a document prepared to be able to specify a kind thereof together with kind information of the document as electronic data and for transmitting the electronic data, a document taking-over apparatus

15  for processing the electronic data to produce it as document information of a predetermined format such as XML (Extensible Markup Language) format, a correspondence retrieval apparatus for transmitting connection information to the document taking-over

20  apparatus to the electronic pen terminal, and a system disposed at a latter stage to utilize the document information processed by the document taking-over apparatus, which are connected to one another through a network.

25  Further, the document taking-over method according to the present invention comprises a step of causing an electronic pen to get information written by hand on a document prepared to be able to specify a

kind thereof together with kind information of the
document as electronic data and causing an electronic
pen terminal to obtain the electronic data from the
electronic pen, a step of causing the electronic pen
5   terminal to transmit the kind information of the
document to a correspondence retrieval apparatus, a
step of causing the correspondence retrieval apparatus
to search memory means of the correspondence retrieval
apparatus for connection information to the document
10   taking-over apparatus for processing the electronic
data while using the kind information as key
information and transmitting the connection information
to the terminal device, a step of causing the
electronic pen terminal to transmit the electronic data
15   to the document taking-over apparatus on the basis of
the connection information, and a step of causing the
document taking-over apparatus to process the
electronic data received on the basis of the format
information stored in memory means of the document
20   taking-over apparatus into document data of XML format,
for example, to register it in the memory means of the
document taking-over means.


BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram schematically
25   illustrating a document or slip taking-over system
according to a first embodiment of the present
invention;

Fig. 2 is a perspective view showing an electronic pen;

Fig. 3 is a block diagram schematically illustrating a document or slip taking-over apparatus;

Fig. 4 is a diagram showing a document or slip definition picture;

Fig. 5 is a diagram showing a detail setting picture of the document or slip taking-over apparatus;

Fig. 6 is a flow chart showing receiving operation of document or slip data;

Fig. 7 is a flow chart showing processing of document or slip data;

Fig. 8 is a flow chart showing delivery operation to an existing system;

Fig. 9 is a diagram showing a list-of-correction-images picture;

Fig. 10 is a diagram showing a document correction picture;

Fig. 11 is a block diagram schematically illustrating a document or slip taking-over system according to a second embodiment of the present invention;

Fig. 12 is a block diagram schematically illustrating a correspondence retrieval apparatus;

Fig. 13 is a diagram showing a registration picture of document or slip taking-over apparatuses;

Fig. 14 is a diagram showing a registration picture of existing systems;

Fig. 15 is a diagram showing a detail setting picture of the document or slip taking-over apparatus; and

Fig. 16 is a flow chart showing operation of 5 delivering XML document or slip data to an existing system;

DETAILED DESCRIPTION OF THE EMBODIMENTS

Embodiments of the present invention are now described in detail with reference to the accompanying 10 drawings. In the embodiments, a document or slip taking-over system and method are described in which information entered by means of an electronic pen on a document or slip which is a document on which special dot patterns are printed is analyzed to be processed or 15 converted into electronic data and the electronic data is processed into data of XML format utilizable in an existing system disposed at the latter stage so that the electronic data is delivered to the existing system. In the drawings to which reference is made 20 below, like reference numerals designate like constituent elements.

[First Embodiment]

The document or slip taking-over system of a first embodiment is now described. Fig. 1 is a 25 schematic diagram illustrating the document or slip taking-over system of the embodiment. As shown in Fig.

1, the document or slip taking-over system of the

embodiment includes an electronic pen terminal 3

including an electronic pen 1 used to input information

to a document or slip 2, a document or slip taking-over

5 apparatus 4 and a correction terminal 8, which are

connected to one another by means of a network 7, and

the document or slip taking-over system 4 is directly

connected to an existing system disposed at the latter

stage by means of a dedicated line or the like.

10 Constituent elements constituting the document or slip

taking-over system of the embodiment are now described

in detail.

(Electronic Pen)

Fig. 2 is a perspective view showing the

15 electronic pen 1 used in the embodiment. As shown in

Fig. 2, the electronic pen 1 includes a pen 10

constituting a writing member for entering necessary

matters on a document or slip 2 on which special dot

patterns are printed, a camera 11 for reading the dot

20 patterns printed on the document or slip 2, a

piezoelectric element 12 for detecting the writing

pressure acting on the pen 10 upon entering, a

processing unit 13 for processing data from the camera

11 and the piezoelectric element 12 and preparing

25 stroke data which is information relating a position of

a pen point moving with entering to the dot patterns, a

memory 14 for storing the prepared stroke data and a

transmission unit 16 for transmitting the position
information to another apparatus.  Further, the
electronic pen 1 includes a display screen 15 for
displaying input circumstances and input error and a
5  vibration motor 17 for transmitting the input error to
the user by vibration.  The transmission unit 16 may
be, for example, an apparatus for transmitting and
receiving data in accordance with a communication
protocol of the Bluetooth (registered trademark) which
10  is a kind of the short-distance radio transmission
technique by means of a radio wave having a
predetermined frequency band, although it may be an
apparatus for transmitting and receiving data in
accordance with a communication protocol of other radio
15  technique, radio LAN (Local Area Network) or cable
communication technique.  Further, the processing unit
13 is composed of CPU (Central Processing Unit), ROM
(Read Only Memory) and electric and electronic circuits
and controls the electronic pen 1 synthetically.  More
20  particularly, the processing unit 13 performs
preparation and storing of the stroke data, addition of
information such as a pen identification ID of the
electronic pen 1, the transmission time and a page
address which is an ID given to the document or slip 2
25  uniquely, transmission of document or slip data,
control of the display screen 15 and the vibration
motor 17 and the like.  The document or slip data is
information containing the stroke data, the pen

identification ID, the transmission time, the page
address and the like.

(Document or Slip)

The document or slip 2 in which data is

5 entered by the electronic pen 1 functions as the
electronic processing paper by printing the special dot
patterns thereon. Peculiar dot patterns which can
specify a page address for identifying the document or
slip 2 are arranged in the document or slip 2. The dot

10 patterns are arranged so that when the space of the
document or slip is divided into a plurality of
rectangular areas each having a predetermined size a
position of each area can be specified, and a position
on the document or slip 2 can be specified on the basis

15 of the dot pattern. Further, document or slip print
information is printed on the document or slip 2. The
user of the document or slip taking-over system looks
at the document or slip print information to identify
entering contents, entering position and the like and

20 can enter information in the document or slip 2. In
addition, information entered in the document or slip 2
by the user of the document or slip taking-over system
by means of the electronic pen 1 is converted into the
stroke data which is position information of

25 handwriting and stored in the memory 14 of the
electronic pen 1.

(Electronic Pen Terminal)

Returning to Fig. 1, the electronic pen terminal 3 is described. The electronic pen terminal 3 is a terminal having the function of receiving document or slip data containing the stroke data sent from the electronic pen 1 by means of a radio receiving unit not shown and transmitting the data to the document or slip taking-over apparatus 4 through the network 7 and is typically realized by a personal computer.

(Document or Slip Taking-Over Apparatus)

The document or slip taking-over apparatus is composed of CPU, RAM (Random Access Memory), ROM, hard-disk drive and the like and is typically realized by a server computer connected to the network 7. The document or slip taking-over apparatus 4 has the function of receiving the document or slip data transmitted from the electronic pen terminal 3 through the network 7 and processing the document or slip data into data of XML format, for example, to deliver the data as XML document or slip data to the existing system 6. Fig. 3 is a block diagram schematically illustrating the document or slip taking-over apparatus 4. Referring now to Fig. 4, the document or slip taking-over apparatus 4 is described in detail. In the embodiment, the document or slip taking-over apparatus 4 processes the document or slip data into the data of XML format to output it, although the output format can

be modified into any format in accordance with the
requirement of the existing system disposed at the
latter stage.   For example, the document or slip data
may be processed into image data or data of CSV (Comma
5    Separated Value) format to be outputted.

As shown in Fig. 3, the document or slip
taking-over apparatus 4 includes a first document or
slip setting information database (DB) 20 storing a
document or slip definition file in which
10   specifications for processing the document or slip data
into the data of XML format are defined, system setting
information in which the document or slip 2 delivered
by the document or slip taking-over apparatus 4 and the
existing system 6 to which the document or slip 2 is
15   delivered are defined, the dot pattern of the document
or slip and document or slip space information
described later, a document or slip information
database (DB) 21 storing XML document or slip data
which is processed data delivered to the existing
20   system 6 and extracted from the document or slip data
into XML format, a temporary information database (DB)
22 which temporarily stores the document or slip data
and image data taken out for the recognition of
characters, a character recognition unit 23 for
25   recognizing characters and selection item of the
document or slip data on the basis of the document or
slip definition file, a preparation unit 24 for
preparing XML document or slip data and document or

slip image described later, a registration unit 25 for registering the prepared XML document or slip data in the document or slip information database 21 and a communication unit 26 for making communication through

5   the network 7.   These units 23, 24 and 25 can be controlled by a software.

Further, the document or slip space information is information relating the dot pattern of the document or slip to the document or slip print

10  information in each page address of the document or slip 2 and is managed by the document or slip taking-over apparatus 4 in the embodiment, although it is considered that the document or slip space information is managed by another server apparatus unitarily.   The

15  document or slip taking-over apparatus 4 of the embodiment includes the character recognition unit 23, although the function of the character recognition unit 23 may be dispersedly provided in another server apparatus connected to the network 7.   The document or

20  slip definition file, information contained in the system setting information and a setting method thereof will be described in detail later.   The above units of the document or slip taking-over apparatus 4 and the function thereof are realized by developing program

25  codes stored in a hard-disk drive of the document or slip taking-over apparatus 4 into the RAM and executing the program codes developed in the RAM.

(Existing System)

The existing system 6 is disposed at the latter stage and is considered to be, for example, a business system which receives the XML document or slip

5   data.  In the embodiment, the existing system 6 is connected through a dedicated line to the document or slip apparatus 4 which prepares the XML document or slip data.  The existing system 6 transmits a document or slip request to the document or slip taking-over

10  apparatus 4 through the dedicated line and when the XML document or slip data which is not transmitted to the existing system 6 is stored in the document or slip information database 21 of the document or slip taking-over apparatus 4 shown in Fig. 3 the existing system 6

15  receives the XML document or slip data to subject it to predetermined processing.

Further, in the embodiment, it is supposed that the existing system 6 is the business system connected through the dedicated line, although it is a

20  matter of course that the existing system 6 may be a newly introduced system or the existing system 6 is not limited to the business system and may be a facsimile or a printer.  Further, the connection method is not limited to the connection using the dedicated line and

25  the existing system 6 may be connected to the document or slip taking-over system 4 through the network 7 or the XML document or slip data may be transmitted as a electronic mail to the existing system 6.

(Correction Terminal)

The correction terminal 8 is a terminal having the communication function of correcting the XML document or slip data processed by the document or slip apparatus 4 before the XML document or slip data is delivered to the existing system 6 and inputting the document or slip definition file and the system setting information and is typically realized by a personal computer. The method of correcting the XML document or slip data by the correction terminal 8 will be described in detail later. In the embodiment, correction of the XML document or slip data is made by the dedicated correction terminal 8, although the XML document or slip data may be corrected by the electric pen terminal 3 or the document or slip taking-over apparatus 4 may be provided with a display unit and an input unit such as a keyboard to correct the XML document or slip data in the document or slip taking-over apparatus 4 by using the display unit and the input unit.

Next, the document or slip taking-over method using the document or slip taking-over system of the embodiment is described in which the document or slip data entered in the document or slip 2 by the user of the document or slip taking-over system by means of the electronic pen 1 is processed into the XML document or slip data utilizable in the existing system 6 and

delivered to the existing system 6.

(Setting of Document or Slip Definition File)

First, on the assumption that the document or
slip taking-over system of the embodiment is utilized,
5   it is necessary to make setting of the document or slip
taking-over apparatus 4 for processing the document or
slip data and setting of specifications for processing
of stroke data entered in the document or slip 2 into
data of XML format and the like.   In the document or
10  slip taking-over system of the embodiment, it is
supposed that the manager of the document or slip
taking-over system, for example, accesses to the
document or slip taking-over apparatus 4 from the
correction terminal 8 through the network 7 and makes
15  the settings.   Fig. 4 is a diagram showing a document
or slip definition picture 35 for setting
specifications for processing of stroke data entered in
the document or slip 2 into data of XML format.   The
document or slip definition picture 35 includes a
20  document or slip display area 48 positioned on the left
side thereof for displaying the document or slip 2 to
which specifications for processing into data of XML
format are set and a detail setting area positioned on
the right side thereof.   The detail setting area
25  includes a page address entering column 36 for
indicating a page address of the document or slip 2, a
file name entering column 37 for entering a name of the

document or slip definition file in which information

set in the document or slip definition picture 35 is

stored, an area ID display column 38 for displaying an

area ID given uniquely to individual entering area

5   described later, an area name entering column 39 for

entering a name of the entering area, an entering

indispensable selection column 40 for selectively

deciding whether entering in the entering area is

indispensable or not, a transfer selection column 41

10  for selectively deciding whether information entered in

the entering area is transferred to the existing system

or not, an attribute selection column 42 for

selectively deciding whether the information entered in

the entering area is character information, selection

15  item information or image information, a character

recognition selection column 43 for selectively

deciding which of character recognition and selection

item recognition is made when the character information

or the selection item information is selected in the

20  attribute selection column 42, a maximum character

number entering column 44 for setting the maximum

number of characters entered in the entering area, an

enterable line number entering column 45 for setting

the number of lines enterable in the entering area, an

25  outer frame selection column 46 for selectively

deciding whether the entering area is that containing

the selection item or not when the entering area

contains the selection item, and a maximum selection

value entering column 47 for setting a maximum

selectable number when the entering area containing the

selection item is selected in the outer frame selection

column 46.  Further, a "registration" button 49 for

5  registering the set information in the document or slip

definition file, a "next" button 50 selectively

operated when a next input area is set and a "end"

button 51 selectively operated when the setting is

ended are arranged in the lower right portion of the

10  document or slip definition picture 35.

Next, the input method of the document or

slip definition information is described with reference

to the document or slip definition picture 35 shown in

Fig. 4.  First, the manager of the document or slip

15  taking-over system inputs a page address of a document

or slip 2 which he wishes to define into the page

address entering column 36.  The document or slip

taking-over apparatus 4 searches the document or slip

information database 21 for the document or slip space

20  data relevant to the page address, so that the document

or slip 2 relevant to the page address inputted in the

page address entering column 36 is displayed in the

document or slip display area 48.  In this connection,

the Written Demand of Opening of Official Document

25  which is a document or slip for demanding the opening

of the official document is shown in the document or

slip display area 48 by way of example.  Next, the

manager uses an input unit such as a mouse to

individually designate areas that the document or slip taking-over apparatus 4 is caused to subject to character recognition or selection item recognition from among the entering columns of the document or slip

5    2 displayed in the document or slip display area 48. The entering areas are decided by this operation.  The decided entering areas are displayed as areas enclosed by broken line as shown in the document or slip display area 48 of Fig. 4.  Next, detail setting is made for

10   each of the decided entering areas.

        The document or slip definition picture 35 shown in Fig. 4 shows an example in which setting into the entering area for "family name" of the name entering column indicated by solid line is made by

15   selecting it by means of the mouse or like from the entering areas shown by broken line in the document or slip display area 48.  The area ID is automatically assigned in order from the left upper portion, for example, when the entering area is decided.  In this

20   example, "001" is assigned to the entering area of "family name" shown by solid line.  When the manager of the document or slip taking-over system selects this entering area, the area is displayed by solid line instead of broken line and "001" which is the area ID

25   of this entering area is displayed in the area ID display column 38.  Then, the manager inputs "family name" into the area name entering column 39 and since this information is an indispensably entering item, the

check mark is inputted into the check box for "Yes" of
the entering indispensable selection column 40. Since
it is indicated that this information is transmitted to
the existing system, the check mark is inputted into
5   the check box for "Yes" of the transfer selection
column 41 and since this information is character
information, the check mark is inputted into the check
box for "character" of the attribute selection column
42. Further, the manager inputs the check mark into
10  the check box for "Yes" of the character recognition
selection column 43 in order to make character
recognition of this information. "10" is inputted into
the maximum character number entering column 44 in
order to set the maximum number of characters to be
15  inputted into this entering area to be 10. "1" is
inputted into the maximum line number entering column
45 in order to set the maximum number of lines to be
inputted in this entering area to be 1. Since this
entering column is not the column for selecting a
20  plurality of items, the check mark is inputted into the
check box for "no presence" of the outer frame
selection column 46. Since the "no presence" is
inputted in the outer frame selection column 46, any
numerical value is not inputted in the maximum
25  selection value entering column 47. The manager inputs
the above setting items to thereby end the detail
setting for the entering areas to which the "family
name" is inputted.

The manager of the document or slip taking-
over system makes setting into all of the entering
areas in the above-mentioned manner and when the
setting into all of the entering areas is ended, the
5  document or slip taking-over apparatus 4 registers the
setting information for the entering areas as the
document or slip definition file into the first
document or slip setting information database 20 of the
document or slip taking-over apparatus 4 shown in Fig.
10  3.

(Registration of System Setting Information)
The operation that the manager of the
document or slip taking-over system inputs the system
setting information containing the correspondence
15  information of the document or slip 2 and the document
or slip taking-over apparatus 4 is next described.  The
manager first accesses to the document or slip taking-
over apparatus 4 from the correction terminal 9 in
order to input the system setting information.  Fig. 5
20  shows a detail setting picture 52 of the document or
slip taking-over apparatus displayed in the correction
terminal 8 when the manager accesses to the document or
slip taking-over apparatus 4.  The document or slip
taking-over apparatus detail setting picture 52 of Fig.
25  5 includes a menu area 53 selected in order to move to
another setting picture, a page address entering column
54 for inputting a page address of a document or slip

processed by the document or slip taking-over apparatus
4, a corresponding document or slip definition file
selection column 55 for selecting a document or slip
definition file corresponding to the document or slip

5   of the page address, an existing system selection
column 56 for selecting an existing system 6 to which
the document or slip taking-over apparatus 4 delivers
data, from among the existing systems connected to the
document or slip taking-over apparatus 4 through the

10  dedicated line, a taken-over document or slip
definition file selection column 57 for selecting a
document or slip definition file in which
specifications of the XML document or slip file to be
delivered to the existing system selected in the

15  existing system selection column 56 is defined, and a
"registration" button 58 selected when the above-set
information is registered.  The manager sets the
existing system 6 to which the document or slip taking-
over apparatus 4 delivers XML document or slip data by

20  using the above picture.  The document or slip taking-
over apparatus 4 registers the information set in the
document or slip taking-over apparatus detail setting
picture 52 as the system setting information to the
first document or slip setting information database 20

25  of the document or slip taking-over apparatus 4 shown
in Fig. 3.

Figs. 6 to 8 are flow charts showing
operation of receiving document or slip data from the

electronic pen terminal 3 and delivering the data to the existing system 6. Referring now to Figs. 6 to 8, operation of processing the document or slip data received from the electronic pen terminal 3 into XML

5 document or slip data of XML format by the document or slip taking-over system 4 and delivering the XML document or slip data to the existing system 6 by using the document or slip taking-over system in which setting of the document or slip definition file and the

10 system setting information is ended is described.


(Reception of Document or Slip Data)

Fig. 6 is a flow chart showing operation of the document or slip taking-out apparatus 4 which receives document or slip data from the electronic pen

15 terminal 3 and transmits a memory clear signal of the electronic pen 1. Referring now to the flow chart of Fig. 6, the operation performed until the document or slip taking-over apparatus 4 transmits the memory clear information of the electronic pen 1 is described in

20 detail (refer to Figs. 1 to 3).

The user of the document or slip taking-over system of the embodiment uses the electronic pen 1 to enter necessary matters in the document or slip 2. The electronic pen 1 adds information such as the

25 identification ID of the electronic pen, the transmission time, the page address for identifying the document or slip 2 to the stroke data entered by the

user of the electronic pen and transmits it as the
document or slip data to the electronic pen terminal 3.
The electronic pen terminal 3 which has received the
document or slip data transmits the received document

5   or slip data to the document or slip taking-over
apparatus 4.  When the document or slip taking-over
apparatus 4 receives the document or slip data
transmitted from the electronic pen terminal 3 (step
S100), the apparatus 4 adds the reception time

10  information to the document or slip data (step S101).
The document or slip taking-over apparatus makes
grammatical examination of the document or slip data
for examining whether any pen stroke is present in the
entering area in which the check mark is entered in

15  "Yes" in the entering indispensable selection column 40
of the document or slip definition picture 35 shown in
Fig. 4 or not (step S102).  Further, in step S102, when
there is no pen stroke in the entering area of the
entering indispensable selection column, the document

20  or slip taking-over apparatus 4 may display an alarm in
the display screen 15 of the electronic pen 1 or may
operate the vibration motor 17 of the electronic pen 1
to produce an alarm to the user.

In step S102, when there is no problem, for

25  example when there is no pen stroke in the entering
dispensable area and so on, the document or slip data
added with the reception time in step S101 is
registered as a temporary file in a document or slip

temporary file contained in the temporary information database 22 of the document or slip taking-over apparatus 4 shown in Fig. 3 (step S103). When the registration of the document or slip data in the

5  document or slip temporary file is ended, the document or slip taking-over apparatus 4 transmits the memory clear signal for clearing the memory 14 of the electronic pen 1 to the electronic pen terminal 3 (step S104). When the electronic pen terminal 3 receives the

10  memory clear signal, the memory clear signal is transmitted to the electronic pen 1 to thereby clear the memory 14 of the electronic pen 1. Further, when the memory 14 of the electronic pen 1 is cleared, the message that transmission of the document or slip data

15  is successful may be displayed in the display screen 15 of the electronic pen 1. In addition, the electronic pen 1 may be previously registered in the system setting information before step S100 that the document or slip data is received to thereby include the

20  procedure of authentication of the electronic pen 1. As described above, the reception processing of the document or slip data is ended.

(Processing of Document or Slip)

        Fig. 7 is a flow chart showing operation of

25  taking out the recognition portion from the entered document or slip data and registering document or slip image data. Referring now to the flow chart shown in

Fig. 7, the operation performed until the document or

slip image data is registered is described in detail

(refer to Figs. 1 and 3). First, the document or slip

taking-over apparatus 4 produces an image of the stroke

5   data in the entering area registered as character

recognition, selection item recognition or picture from

the document or slip data registered in the document or

slip temporary file in accordance with the entering

area defined in the document or slip definition file

10  and takes out the portion to be character-recognized or

selection-item-recognized as recognition portion image

and the portion to be registered as picture as picture

image (step S200). The taken-out recognition portion

image or picture image is registered in a recognition

15  temporary file contained in the temporary information

database 22. The character recognition unit 23 makes

character recognition or selection item recognition of

the recognition portion image in accordance with

setting of the document or slip definition file (step

20  S201) and the preparation unit 24 combines the

recognized result, the picture image and the document

or slip print information contained in the document or

slip space information stored in the first document or

slip setting information database 20 to prepare the

25  document or slip image data (step S202). The document

or slip image data is registered in a document or slip

image temporary file stored in the temporary

information database 22. The preparation unit 24 of

the document or slip taking-over apparatus 4 prepares a

document or slip correction picture for confirming

whether there is any error in the document or slip

image data or not and transmits the document or slip

5   correction picture to the correction terminal 8, for

example, so that the manager of the document or slip

taking-out system can correct the document or slip

image data (step S203). The format of the image data

can use PNG (Portable Network Graphics) format or BMP

10   (Bit Map) format.

Fig. 9 shows a list-of-correction-images

picture 60 in which a list of document or slip image

data registered in the document or slip image temporary

file of the document or slip taking-out apparatus 4 is

15   displayed. The list-of-correction-images picture 60 is

displayed in the correction terminal 8 when the

document or slip taking-over apparatus 4 is accessed

and displays a list of document or slip image data

preserved in the document or slip taking-out apparatus

20   4 at this time. The list-of-correction-images picture

60 includes a menu area 61 selected in order to move

another setting picture, a document or slip name

entering column 62 in which, when a document or slip to

be corrected is searched for, the document or slip

25   definition file name thereof is entered, a pen name

entering column 63 in which a pen name is entered when

the document or slip image data to be corrected is

searched for while using the ID of the pen entered in

the document or slip as key information, a document or slip selection area 64 in which a list of document or slip image data registered in the document or slip image temporary file is displayed, an "edit" button 65

5   which is selectively operated to edit the selected document or slip image data, and a "delete" button 66 for deleting the selected document or slip image data.

The manager of the document or slip taking-out system uses the list-of-correction-images picture

10  60 to select a desired document or slip correction picture described later. The manager selects a desired document or slip correction picture by the operation of inputting the document or slip definition file name into the document or slip name entering column and

15  selecting a "display" button or by the operation of inputting the ID of the pen entered in the document or slip into the pen name entering column 63 and selecting the "display" button and enters the check mark in the check box of the document or slip image data that he

20  wishes to correct from the list of document or slip image data displayed in the document or slip selection area 64 and then operates the "edit" button. The display picture is changed to the document or slip correction picture for correcting the individual

25  document or slip image data in response to the operation. Further, when there is unnecessary document or slip image data, the document or slip image data can be deleted by the operation of entering the check mark

in the check box of the document or slip image data and operating the "delete" button 66. The document or slip image data having "during editing" being displayed in the document or slip selection area 64 represents that

5  it is being corrected in another correction terminal. In this case, exclusive control is made to prevent correction operation by the correction terminal 8. In this case, only reading or perusal may be made.

Fig. 10 shows the document or slip correction

10  picture 70. The document or slip correction picture 70 includes a document or slip image area 71 reproduced from the stroke data displayed on the left side of the picture, a document or slip correction area in which the stroke data inputted in the entering area displayed

15  on the right side of the picture and the recognized results are displayed together, an "OK" button 76 selected upon completion of the correction, and a "cancel" button 77 for ending the correction on the way thereof.

20  A family name confirmation area 72, a given name confirmation area 73 and an address confirmation area 74 contained in the document or slip correction area of the document or slip correction picture 70 shown in Fig. 10 are areas for confirming the character

25  recognition results. The manager or the user can confirm whether the entering characters are recognized exactly and when there is a portion that he wishes to correct, the portion to be corrected is selected by the

mouse or the like and can be corrected by means of the keyboard. Further, a demandant classification confirmation area 75 is an area for confirming the selection item recognition result. The manager or the

5    user can confirm whether the checked items are recognized exactly and when there is a portion that he wishes to correct, the portion can be corrected similarly.

When the document or slip correction picture

10    70 is utilized to complete the correction of the document or slip image data, the manager or the user selects the "OK" button 76. The document or slip taking-over apparatus 4 registers the document or slip image data in the document or slip image temporary file

15    in response to the selection of the "OK" button again (step S204). The document or slip image data is prepared by the foregoing operation.

(Cooperation with Existing System)

Fig. 8 is a flow chart showing operation of

20    processing the document or slip image to which data has been inputted, into XML document or slip data and transmitting the XML document or slip data. The operation performed until the XML document or slip data is transmitted is now described in detail with

25    reference to the flow chart shown in Fig. 8 (refer to Figs. 1 and 3). The document or slip taking-over apparatus 4 first processes the document or slip image

data registered in the document or slip image temporary file into the XML format (step S300) and extracts the item having the check mark entered in "Yes" in the transfer information selection area 41 of the document

5    or slip definition picture 35 from the document or slip image data processed into the XML format (step S301). The document or slip taking-over apparatus 4 registers the extracted document or slip data processed into the XML format as the XML document or slip data in the

10   document or slip information database 21 (step S302). When a document or slip request for requiring the XML document or slip data is transmitted from the existing system 6, the XML document or slip data is transmitted to the existing system 6 (step S303). The transmission

15   processing of the XML document or slip data is completed as described above. In the embodiment, the XML document or slip data is of the pull type that the data is transmitted to the existing system 6 in response to a request of the existing system 6,

20   although the XML document or slip data may be of the push type that the document or slip taking-over apparatus 4 transmits the XML document or slip data to the existing system 6 when the XML document or slip data is registered or at a predetermined time or the

25   like. Further, in step S301, the information delivered to the existing system 6 is extracted, although the extraction process may be omitted and all information may be delivered to the existing system 6. In this

case, the existing system 6 extracts necessary information.

[Second Embodiment]

5       A document or slip taking-over system of a second embodiment is now described. Fig. 11 schematically illustrates the document or slip taking-over system of the second embodiment. As shown in Fig. 11, the document or slip taking-over system of the

10 embodiment comprises a plurality of electronic pen terminals 3 each having an electronic pen 1 used to input information written by hand on a document or slip 2, a plurality of document or slip taking-over apparatuses 4, a correspondence retrieval apparatus 5,

15 and a plurality of existing systems disposed at the latter stage, which are connected to one another through a network 7. The electronic pen 1, the document or slip 2, the electronic pen terminals 3, the document or slip taking-over apparatuses 4, the

20 existing systems 6 and the network 7 are substantially identical with those of the first embodiment and accordingly detailed description thereof is omitted. However, different points in operation from that of each constituent element of the document or slip

25 taking-over system of the first embodiment are described in subsequent description each time it happens.

(Correspondence Retrieval Apparatus)

The correspondence retrieval apparatus 5 includes CPU, RAM, ROM and hard-disk drive and is typically realized by a server computer connected to the network 7. Fig. 12 is a block diagram schematically illustrating the correspondence retrieval apparatus 5. As shown in Fig. 12, the correspondence retrieval apparatus 5 includes a second document or slip setting information database (DB) 80 for storing system setting information which defines the document or slip 2 delivered by the document or slip taking-over apparatus 4 and the existing system which is a delivery destination of the document or slip 2, document or slip space information and the like, a retrieval unit 81 for retrieving or searching for correspondence of the document or slip 2 and the document or slip taking-over apparatus 4, a preparation unit 82 for preparing an input picture of the system setting information and the like, a registration unit 83 for registering an inputted correspondence table in the second document or slip setting information database 80 and a communication unit 84 for making communication through the network 7. These units 81, 82 and 83 can be controlled by a software.

The second document or slip setting information database 80 is formed in a storage apparatus such as a hard-disk drive of the correspondence retrieval apparatus 5 and page addresses

for identifying the document or slip in each document or slip taking-over apparatus are registered or set in the system setting information stored in the second document or slip setting information database 80 in a

5   corresponding manner to the document or slip taking-over apparatus.  The correspondence retrieval apparatus 5 has the function responsive to a processing request containing a page address transmitted from the electronic pen terminal 3 to retrieve an address of the

10  document or slip taking-over apparatus 4 corresponding to the page address by the retrieval unit 81 and transmit it to the electronic pen terminal 3 and the function of setting the system setting information and the like received through the network 7.  The

15  information contained in the system setting information set by the setting function and the setting method thereof will be described later in detail.  The units and the function of the correspondence retrieval apparatus 5 are realized by developing program codes

20  stored in a hard-disk drive of the correspondence retrieval apparatus 5 into the RAM and executing the program codes developed in the RAM.

The document or slip taking-over method performed by the document or slip taking-over system of

25  the embodiment for processing the document or slip data entered in the document or slip 2 by the user of the document or slip taking-over system by means of the electronic pen 1 into XML document or slip data

utilizable in the existing system 6 and delivering it to the existing system is now described.

First, on the assumption that the document or slip taking-over system of the embodiment is utilized,

5  it is necessary to previously input the document or slip definition file and the system setting information in the same manner as the first embodiment.  In the first embodiment, the manager of the document or slip taking-over system accesses to the document or slip

10  taking-over apparatus 4 from the correction terminal 8 to make the setting, although in the document or slip taking-over system of the second embodiment the manager of the document or slip taking-over system accesses to the document or slip taking-over apparatus 4 from the

15  electronic pen terminal 3 through the network 7 to input the document or slip definition file and accesses to the correspondence retrieval apparatus 5 to input the system setting information.

(Setting of Document or slip Definition File)

20  As described above, in the embodiment, the setting of the document or slip definition file is made in the document or slip taking-over apparatus 4 from the electronic pen terminal 3 through the network 7 and the input picture thereof is the same as the document

25  or slip definition picture 35 of Fig. 4 described in the first embodiment.  The input method thereof is also the same and accordingly description thereof is

omitted.

(Registration of Document or slip Taking-Over
Apparatus)

Operation of inputting the system setting
5   information containing the correspondence information
of the document or slip 2 and the document or slip
taking-over apparatus 4 is now described.  First, the
manager of the document or slip taking-over system of
the embodiment accesses to the correspondence retrieval
10  apparatus 5 from the electronic pen terminal 3 so as to
input the system setting information.  Fig. 13 shows a
registration picture 85 of the document or slip taking-
over apparatus displayed in the electronic pen terminal
3 when the manager accesses to the correspondence
15  retrieval apparatus 5.  The document or slip taking-
over apparatus registration picture 85 includes a menu
area 86 selected in order to move another setting
picture, a name-of-document or slip-taking-over-
apparatus entering column 87 for entering names of the
20  document or slip taking-over apparatuses to be
registered, an address-of-document or slip-taking-over-
apparatus entering column 88 for entering addresses and
port numbers of the document or slip taking-over
apparatuses to be registered, and a registration button
25  89 for registering the entered information.  The
manager uses this picture to input the names of the
document or slip taking-over apparatuses utilized in

the document or slip taking-over system of the

embodiment into the name-of-document or slip-taking-

over-apparatus entering column 87 and input the

addresses and the port numbers of the document or slip

5    taking-over apparatuses into the address-of-document or

slip-taking-over-apparatus entering column 88 to

thereby register a plurality of document or slip

taking-over apparatuses.


(Registration of Existing System)

10           Next, the manager registers the existing

system utilized in the document or slip taking-over

system of the embodiment.  For this purpose, the

manager selects the item of "registration of existing

system" from the menu area 86 of the document or slip

15   taking-over apparatus registration picture 85.

Consequently, the display picture is changed to a

registration picture 90 of the existing system shown in

Fig. 14.  The existing system registration picture 90

shown in Fig. 14 includes a menu area 91, a name-of-

20   existing-system entering column 92 for entering names

of the existing systems to be registered, an address-

of-existing system entering column 93 for entering

addresses and port numbers of the existing systems to

be registered, and a registration button 94 for

25   registering the entered information.  The manager uses

this picture to input names of existing systems

utilized in the document or slip taking-over system of

the embodiment into the name-of-existing-system
entering column 92 and input addresses and port numbers
of the existing systems into the address-of-existing-
system entering column 93 to thereby register a

5    plurality of existing system.


(Registration of System Setting Information)

          Next, the manager selects the item of "detail
setting" from the menu area 91 of the existing system
registration picture 90 in order to make the detail

10   setting of the document or slip taking-over apparatus
     4.   The display picture is changed to a detail setting
     picture 95 of the document or slip taking-over
     apparatus shown in Fig. 15.   The document or slip
     taking-over apparatus detail setting picture 95 of

15   shown in Fig. 15 includes a menu area 96, a document or
     slip taking-over apparatus selection column 97 for
     selecting the document or slip taking-over apparatus 4
     to be subjected to detail setting, a page address
     entering column 98 for inputting a page address of the

20   document or slip to be processed by the document or
     ·slip taking-over apparatus 4 selected in the selection
     column 97, a corresponding document or slip definition
     file selection column 99 for selecting a document or
     slip definition file corresponding to the document or

25   slip 2 of the page address, an existing system
     selection column 100 for selecting the existing system
     6 delivered by the document or slip taking-over

apparatus 4 from the existing systems registered in the

existing system registration picture 90 of Fig. 14, and

a taken-over document or slip definition file selection

column 101 for selecting the document or slip

5    definition file in which specifications of the XML

document or slip file delivered to the existing system

6 selected in the existing system selection column 100

are defined.  The manager uses this picture to set the

document or slip taking-over apparatus 4 for processing

10   the document or slip data of the document or slip 2 and

sets the existing system 6 to which the document or

slip taking-over apparatus 2 delivers the XML document

or slip data.  The correspondence retrieval apparatus 5

registers the information set in the document or slip

15   taking-over apparatus registration picture 85, the

existing system registration picture 90 and the

document or slip taking-over apparatus detail setting

picture 95 as the system setting information in the

second document or slip setting information database 80

20   of the correspondence retrieval apparatus 5 shown in

Fig. 12 and transmits the system setting information

and the document or slip space information of the page

address defined in the system setting information to

the document or slip taking-over apparatus 4 selected

25   in the document or slip taking-over apparatus selection

column 97 through the network 7.  The document or slip

taking-over apparatus 4 registers the received system

setting information and the document or slip space

information in the first document or slip setting

information database 20 shown in Fig. 3.

As described above, by defining the system

setting information for each of the plurality of

5  document or slip taking-over apparatuses, for example,

even when the electronic pen 1 is used to make entering

in a plurality of kinds of documents/slips, the

document or slip data is transmitted to the document or

slip taking-over apparatus corresponding to each

10  document or slip and is processed by the document or

slip taking-over apparatus to be transmitted as the XML

document or slip data to the existing system

corresponding to each data from among the plurality of

existing systems.

15      Referring now to the flow chart shown in Fig.

16, operation that the document or slip taking-over

apparatus 4 processes the document or slip data

transmitted from the electronic pen 1 into the XML

document or slip data utilizable in the existing system

20  6 and delivers the XML document or slip data to the

existing system 6 in the document or slip taking-over

system of the embodiment in which the document or slip

definition file and the system setting information have

been registered is described (refer to Figs. 1, 3 and

25  12).

First, the user of the document or slip

taking-over system uses the electronic pen 1 to enter

necessary matters in the document or slip 2.  The

electronic pen 1 add the information such as the
identification ID of the electronic pen 1, the
transmission time and the page address for identifying
the document or slip 2 to the stroke data entered by
5   the user of the electronic pen and transmits it as the
document or slip data to the electronic pen terminal 3.
The electronic pen terminal 3 which has received the
document or slip data transmits a document or slip data
processing request to the correspondence retrieval
10  apparatus 5 in order to inquire the address of the
document or slip taking-over apparatus 4 for processing
the document or slip data (step S400).

The document or slip data processing request
contains the page address of the document or slip 2.
15  The correspondence retrieval apparatus 5, when received
the document or slip data processing request (step
S401), retrieves the document or slip taking-over
apparatus 4 corresponding the page address of the
document or slip 2 from the system setting information
20  stored in the second document or slip setting
information database 80 (step S402). The
correspondence retrieval apparatus 5 transmits the
address which is the connection information to the
retrieved document or slip taking-over apparatus 4 to
25  the electronic pen terminal 3 (step S403).

When the electronic pen terminal 3 receives
the address of the document or slip taking-over
apparatus 4 (step S404), the electronic pen terminal 3

transmits the document or slip data received from the
electronic pen 1 to the document or slip taking-over
apparatus 4 of the address (step S405). When the
document or slip taking-over apparatus 4 receives the
5    document or slip data (step S406), the document or slip
taking-over apparatus 4 registers the document or slip
data in the document or slip temporary file stored in
the temporary information database 22. The document or
slip taking-over apparatus 4 transmits the memory clear
10   signal to the electronic pen terminal 3 in order to
clear the memory 14 of the electronic pen 1 (step
S407). When the electronic pen terminal 3 receives the
memory clear signal (step S408), the electronic pen
terminal 3 transmits the memory clear signal to the
15   electronic pen 1 to clear the memory 14 of the
electronic pen 1 (step S409). The document or slip
taking-over apparatus 4 performs recognition of
characters and taking-out of images contained in the
document or slip data registered in the document or
20   slip temporary file on the basis of the document or
slip definition file stored in the first document or
slip setting information database 20 and prepares the
XML document or slip data (step S410) to register the
prepared XML document or slip data in the document or
25   slip information database 26 (step S411).

When the existing system 6 transmits the
document or slip request to the document or slip
taking-out apparatus 4 (step S412), the document or

slip taking-out apparatus 4 which has received the document or slip request (step S413) refers to the document or slip information database 21 and, when there is an XML document or slip data which is not

5 transmitted to the existing system6, transmits the XML document or slip data to the existing system 6 (step S414). The existing system 6 receives the XML document or slip data (step S415) and performs the predetermined processing. As described above, the handwritten

10 information inputted by the user of the document or slip taking-out apparatus 4 by means of the electronic pen 1 is delivered as the XML document or slip data to the existing system 6. The operation in steps S406 to S415 corresponds to the flow chart shown in Figs. 6 to

15 8.

The embodiments of the present invention have been described in detail with reference to the drawings, while the foregoing is just the embodiments and various changes or modifications and improvements

20 may be made in the present invention on the basis of the knowledge of those skilled in the art without departing from the spirit and scope of the present invention as hereinafter claimed. For example, the electronic pen and the user may be registered in the

25 correspondence retrieval apparatus and the electronic pen and the user may be subjected to authentication using a password or electronic key so that the security of the document or slip taking-over system can be

improved.  Further, in this case, the access authority
may be set to the user to distinguish the user and the
manager.

According to the present invention, the
5   handwritten information can be utilized easily without
performing complicated processing in the system
disposed at the latter stage which utilizes the
information.

It should be further understood by those
10  skilled in the art that although the foregoing
description has been made on embodiments of the
invention, the invention is not limited thereto and
various changes and modifications may be made without
departing from the spirit of the invention and the
15  scope of the appended claims.